

SEQUENCE LISTING

<110> FOGHER, CORRADO

<120> A SYNTHETIC POLYNUCLEOTIDE CODING FOR HUMAN
LACTOFERRIN, VECTORS, CELLS AND TRANSGENIC PLANTS
CONTAINING IT

<130> 618484-4/JP/B-4075PCT

<140> 09/743,823

<141> 2001-01-16

<150> IT RM98A000478

<151> 1998-07-17

<160> 25

<170> PatentIn Ver. 2.1

<210> 1

<211> 2079

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic DNA
encoding human lactoferrin

<220>

<221> CDS

<222> (1)..(2076)

<400> 1

ggc cgt agg aga agg agt gtt caa tgg tgc gca gta tca caa cca gag	48
Gly Arg Arg Arg Arg Ser Val Gln Trp Cys Ala Val Ser Gln Pro Glu	
1 5 10 15	
gcc aca aaa tgc ttc caa tgg caa agg aat atg aga aaa gtt cgt gga	96
Ala Thr Lys Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg Gly	
20 25 30	
cct cct gta tct tgc ata aag aga gat tca ccc atc cag tgt atc cag	144
Pro Pro Val Ser Cys Ile Lys Arg Asp Ser Pro Ile Gln Cys Ile Gln	
35 40 45	
gca att gcg gaa aac aga gct gat gct gtg act ctt gat ggt ggt ttc	192
Ala Ile Ala Glu Asn Arg Ala Asp Ala Val Thr Leu Asp Gly Gly Phe	
50 55 60	
ata tac gag gca gga ctt gcc cca tac aaa ctg cga cct gta gcg gcg	240
Ile Tyr Glu Ala Gly Leu Ala Pro Tyr Lys Leu Arg Pro Val Ala Ala	
65 70 75 80	
gaa gtc tac ggg acc gaa aga caa cca cga act cac tat tat gct gtg	288
Glu Val Tyr Gly Thr Glu Arg Gln Pro Arg Thr His Tyr Tyr Ala Val	
85 90 95	

gct gtt gtg aag aag ggc gga tct ttt cag ctg aac gaa ctt caa ggt	336
Ala Val Val Lys Lys Gly Gly Ser Phe Gln Leu Asn Glu Leu Gln Gly	
100 105 110	
ctg aag tca tgc cac aca gga ctt cgc agg acc gct gga tgg aat gtc	384
Leu Lys Ser Cys His Thr Gly Leu Arg Arg Thr Ala Gly Trp Asn Val	
115 120 125	
cct ata ggg aca ctt cgt cca ttc ttg aat tgg acg ggt cca cct gag	432
Pro Ile Gly Thr Leu Arg Pro Phe Leu Asn Trp Thr Gly Pro Pro Glu	
130 135 140	
ccc att gag gca gct gtg gca aga ttc ttc tca gcc tct tgt gtt cca	480
Pro Ile Glu Ala Ala Val Ala Arg Phe Phe Ser Ala Ser Cys Val Pro	
145 150 155 160	
ggg gca gat aaa gga caa ttc ccc aac ctt tgt cgc ctg tgt gcg ggg	528
Gly Ala Asp Lys Gly Gln Phe Pro Asn Leu Cys Arg Leu Cys Ala Gly	
165 170 175	
aca ggg gaa aac aaa tgt gca ttc tca tcc cag gaa ccg tac ttc agc	576
Thr Gly Glu Asn Lys Cys Ala Phe Ser Ser Gln Glu Pro Tyr Phe Ser	
180 185 190	
tac tct ggt gcc ttt aag tgt ctt aga gac ggt gct gga gat gtt gct	624
Tyr Ser Gly Ala Phe Lys Cys Leu Arg Asp Gly Ala Gly Asp Val Ala	
195 200 205	
ttt att aga gag agc aca gtg ttt gag gat ctt tca gac gag gct gaa	672
Phe Ile Arg Glu Ser Thr Val Phe Glu Asp Leu Ser Asp Glu Ala Glu	
210 215 220	
agg gac gag tat gag tta ctc tgc cca gac aac act cgt aag cca gtt	720
Arg Asp Glu Tyr Glu Leu Leu Cys Pro Asp Asn Thr Arg Lys Pro Val	
225 230 235 240	
gac aag ttc aaa gat tgc cat ctt gca cgg gtc cct tct cat gcc gtt	768
Asp Lys Phe Lys Asp Cys His Leu Ala Arg Val Pro Ser His Ala Val	
245 250 255	
gtg gca cga agt gtt aat gga aag gag gat gcc atc tgg aat ctt ctc	816
Val Ala Arg Ser Val Asn Gly Lys Glu Asp Ala Ile Trp Asn Leu Leu	
260 265 270	
cgc caa gca cag gaa aag ttt gga aag gac aag tca ccg aaa ttc cag	864
Arg Gln Ala Gln Glu Lys Phe Gly Lys Asp Lys Ser Pro Lys Phe Gln	
275 280 285	
ctc ttt ggt tcc cct agt ggg cag aaa gat ctt ctg ttc aag gac tct	912
Leu Phe Gly Ser Pro Ser Gly Gln Lys Asp Leu Leu Phe Lys Asp Ser	
290 295 300	
gcc att ggg ttt tcg aga gtg cca cct agg ata gat tct ggg ttg tac	960
Ala Ile Gly Phe Ser Arg Val Pro Pro Arg Ile Asp Ser Gly Leu Tyr	
305 310 315 320	

ctt ggc tcc gga tac ttt act gca att cag aac ttg agg aaa agt gag	1008
Leu Gly Ser Gly Tyr Phe Thr Ala Ile Gln Asn Leu Arg Lys Ser Glu	
325 330 335	
gag gaa gtt gct gcc cgg cgt gcg cgg gtc gtt tgg tgt gcg gtg gga	1056
Glu Glu Val Ala Ala Arg Arg Ala Arg Val Val Trp Cys Ala Val Gly	
340 345 350	
gag caa gag ttg cgc aag tgt aac cag tgg agt ggt ttg agc gaa gga	1104
Glu Gln Glu Leu Arg Lys Cys Asn Gln Trp Ser Gly Leu Ser Glu Gly	
355 360 365	
tct gtg acc tgc tca tcg gcc tcc act aca gaa gat tgc atc gcc ctg	1152
Ser Val Thr Cys Ser Ser Ala Ser Thr Thr Glu Asp Cys Ile Ala Leu	
370 375 380	
gtg ttg aaa gga gaa gct gat gcc atg agt ttg gat gga gga tat gtt	1200
Val Leu Lys Gly Glu Ala Asp Ala Met Ser Leu Asp Gly Gly Tyr Val	
385 390 395 400	
tac act gca ggt aaa tgt ggt ttg gtg cct gtc ctt gca gag aac tac	1248
Tyr Thr Ala Gly Lys Cys Gly Leu Val Pro Val Leu Ala Glu Asn Tyr	
405 410 415	
aaa tca caa caa agc agt gac cct gat cct aac tgt gtg gat aga cct	1296
Lys Ser Gln Gln Ser Ser Asp Pro Asp Pro Asn Cys Val Asp Arg Pro	
420 425 430	
gtg gaa gga tat ctt gct gtg gcg gtg gtt agg aga tca gac act agc	1344
Val Glu Gly Tyr Leu Ala Val Ala Val Val Arg Arg Ser Asp Thr Ser	
435 440 445	
ctt acc tgg aac tct gtg aaa ggc aag aag tcc tgc cac acc gcc gtg	1392
Leu Thr Trp Asn Ser Val Lys Gly Lys Lys Ser Cys His Thr Ala Val	
450 455 460	
gac agg act gca ggt tgg aat atc ccc atg gga ttg ctc ttc aac cag	1440
Asp Arg Thr Ala Gly Trp Asn Ile Pro Met Gly Leu Leu Phe Asn Gln	
465 470 475 480	
acg ggc tcc tgc aaa ttt gat gaa tat ttc agt caa agc tgt gcc cct	1488
Thr Gly Ser Cys Lys Phe Asp Glu Tyr Phe Ser Gln Ser Cys Ala Pro	
485 490 495	
ggt tct gac cca aga tct aat ctc tgt gct ttg tgt att gga gat gag	1536
Gly Ser Asp Pro Arg Ser Asn Leu Cys Ala Leu Cys Ile Gly Asp Glu	
500 505 510	
caa ggt gag aat aag tgc gtt ccc aac agc aac gag aga tac tac ggt	1584
Gln Gly Glu Asn Lys Cys Val Pro Asn Ser Asn Glu Arg Tyr Tyr Gly	
515 520 525	
tac act ggg gct ttc cgt tgc ttg gct gag aat gct gga gac gtt gca	1632
Tyr Thr Gly Ala Phe Arg Cys Leu Ala Glu Asn Ala Gly Asp Val Ala	
530 535 540	

ttt	gtg	aaa	gat	gtc	act	gtc	ttg	cag	aac	act	gat	gga	aat	aac	aat	1680
Phe	Val	Lys	Asp	Val	Thr	Val	Leu	Gln	Asn	Thr	Asp	Gly	Asn	Asn	Asn	
545					550					555					560	
gag	gca	tgg	gct	aag	gat	ttg	aag	ctt	gca	gac	ttt	gcg	ttg	ctg	tgc	1728
Glu	Ala	Trp	Ala	Lys	Asp	Leu	Lys	Leu	Ala	Asp	Phe	Ala	Leu	Leu	Cys	
				565					570					575		
ctc	gat	ggc	aaa	cgt	aag	cct	gtg	act	gaa	gct	aga	agc	tgc	cat	ctt	1776
Leu	Asp	Gly	Lys	Arg	Lys	Pro	Val	Thr	Glu	Ala	Arg	Ser	Cys	His	Leu	
			580					585					590			
gcc	atg	gcc	ccg	aat	cat	gct	gtg	gtg	tct	cgt	atg	gat	aag	gtg	gaa	1824
Ala	Met	Ala	Pro	Asn	His	Ala	Val	Val	Ser	Arg	Met	Asp	Lys	Val	Glu	
		595					600					605				
cgc	ttg	aaa	cag	gtg	ttg	ctc	cac	caa	cag	gct	aaa	ttt	ggc	aga	aat	1872
Arg	Leu	Lys	Gln	Val	Leu	Leu	His	Gln	Gln	Ala	Lys	Phe	Gly	Arg	Asn	
	610					615					620					
gga	tct	gac	tgc	ccg	gac	aag	ttt	tgc	tta	ttc	cag	tct	gaa	acc	aaa	1920
Gly	Ser	Asp	Cys	Pro	Asp	Lys	Phe	Cys	Leu	Phe	Gln	Ser	Glu	Thr	Lys	
625					630					635					640	
aac	ctt	ttg	ttc	aat	gac	aac	act	gag	tgt	ctt	gcc	aga	ctc	cat	ggc	1968
Asn	Leu	Leu	Phe	Asn	Asp	Asn	Thr	Glu	Cys	Leu	Ala	Arg	Leu	His	Gly	
				645					650					655		
aaa	aca	aca	tat	gaa	aaa	tat	ttg	gga	cca	cag	tat	gtc	gca	ggc	att	2016
Lys	Thr	Thr	Tyr	Glu	Lys	Tyr	Leu	Gly	Pro	Gln	Tyr	Val	Ala	Gly	Ile	
			660					665					670			
act	aat	ctg	aaa	aag	tgc	tca	acc	tcc	cca	ctc	cta	gaa	gcc	tgt	gaa	2064
Thr	Asn	Leu	Lys	Lys	Cys	Ser	Thr	Ser	Pro	Leu	Leu	Glu	Ala	Cys	Glu	
		675					680					685				
ttc	cta	agg	aag	taa												2079
Phe	Leu	Arg	Lys													
			690													

<210> 2

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic DNA

<400> 2

ggatccatgg gccgtaggag aaggagtgtt

30

<210> 3

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic DNA

<400> 3

gagctccttc ggttttactt cctgaggaat tc

32

<210> 4

<211> 42

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic DNA

<400> 4

tctagataaa ataatctata cattaaaaaa ttgatttta aa

42

<210> 5

<211> 36

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic DNA

<400> 5

ggatccgact gagtcggata agaagaaaag aaaaga

36

<210> 6

<211> 36

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic DNA

<400> 6

tctagagttt tcaaatttga attttaatgt gtggtg

36

<210> 7

<211> 36

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic DNA

<400> 7

ggatcccacc ttaaggaggt tgcaacgagc gtggca

36

<210> 8

<211> 250

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic DNA

<400> 8

```
ggccgtagga gaaggagtgt tcaatggtgc gcagtatcac aaccagaggc cacaaaatgc 60
ttccaatggc aaaggaatat gagaaaagtt cgtggacctc ctgtatcttg cataaagaga 120
gattcaccca tccagtgtat ccaggcaatt gcggaaaaca gagctgatgc tgtgactctt 180
gatggtgggt tcatatacga ggcaggactt gcccataca aactgcgacc tgtagcggcg 240
gaagtctacg                                     250
```

<210> 9

<211> 250

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic DNA

<400> 9

```
gcacctggaa cacaagaggc tgagaagaat cttgccacag ctgcctcaat gggctcaggt 60
ggacccgtcc aattcaagaa tggacgaagt gtccctatag ggacattcca tccagcggtc 120
ctgcgaagtc ctgtgtggca tgacttcaga ccttgaagtt cgttcagctg aaaagatccg 180
cccttcttca caacagccac agcataatag tgagttcgtg gttgtctttc ggtcccgtag 240
acttccgccg                                     250
```

<210> 10

<211> 250

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic DNA

<400> 10

```
aactggctta cgagtgttgt ctgggcagag taactcatatc tcgtcccttt cagcctcgtc 60
tgaaagatcc tcaaactctg tgctctctct aataaaagca acatctccag caccgtctct 120
aagacactta aaggcaccag agtagctgaa gtacggttcc tgggatgaga atgcacattt 180
gttttccctt gtccccgcac acaggcgaca aagggtgggg aattgtcctt tatctgcacc 240
tggaacacaa                                     250
```

<210> 11

<211> 255

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic DNA

<400> 11

```
gtacaaccca gaatctatcc taggtggcac tctcgaaaac ccaatggcag agtccttgaa 60
cagaagatct ttctgcccac taggggaacc aaagagctgg aatttcgggtg acttgtcctt 120
tccaaacttt tcctgtgctt ggcggagaag attccagatg gcacctcctt ttccattaac 180
```


acttcgtgcc acaacggcat gagaagggac ccgtgcaaga tggcaatctt tgaacttgtc 240
aactggctta cgagt 255

<210> 12
<211> 251
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic DNA

<400> 12
tattcctccat ccaaactcat ggcatcagct tctcctttca acaccagggc gatgcaatct 60
tctgtagtgg aggccgatga gcaggtcaca gatccttcgc tcaaaccact ccactgggta 120
cacttgcgca actcttgctc tcccaccgca caccaaacga cccgcgcacg ccgggcagca 180
acttcctcct cacttttcct caagttctga attgcagtaa agtatccgga gccaaaggta 240
aaccagaat c 251

<210> 13
<211> 75
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic DNA

<400> 13
atggcttcta tcttccacta ctttttagcc ctctctcttt ctgctcttt tcttttcttc 60
ttatccgact cagtc 75

<210> 14
<211> 189
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic DNA

<400> 14
atgatgagag cgcggttccc attactgttg ctgggagttg ttttcctagc atcagtttct 60
gtctcatttg gcattgcgta ttgggaaaag cagaacccca gtcacaacaa gtgcctccga 120
agttgcaata gcgagaaaga ctctacagg aaccaagcat gccacgctcg ttgcaacctc 180
cttaagggtg 189

<210> 15
<211> 250
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic DNA

<400> 15

```
gagcaatccc atggggatat tccaacctgc agtcctgtcc acggcgggtgt ggcaggactt 60
cttgcctttc acagagttcc aggtaaggct agtgtctgat ctccaaacca ccgccacagc 120
aagatatacct tccacaggct tatccacaca gttaggatca gggtcactgc tttgttgtga 180
tttgtagttc tctgcaagac aggcaccaaa ccacatttac ctgcagtgtg aacatatacct 240
ccatccaaac                                     250
```

<210> 16

<211> 254

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic DNA

<400> 16

```
ccatcagtgt tctgcaagac agtgacatct ttcacaaatg caacgtctcc agcatttctca 60
gccaagcaac ggaaagcccc agtgtaaccg tagtatctct cgttgctgtt gggaacgcac 120
ttattctcac cttgctcatc tccaatacac aaagcacaga gattagatct tgggtcagaa 180
ccaggggcac agctttgact gaaatattca tcaaatttgc aggagcccgt ctggttgaag 240
agcaagccca tggg                                     254
```

<210> 17

<211> 229

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic DNA

<400> 17

```
gcagtcagat ccatttctac caaathtagc ctggttggtgg agcaacacct gtttcaagcg 60
ttccacctta tccatacgag acaccacagc atgattcggg gccatggcaa gatggcagct 120
tctagcttca gtcacaggct tacgtttgcc atcgaggcac agcaacgcaa agtctgcaag 180
cttcaaatac ttagcccatg cctcattgtt atttccatca gtgttctgc 229
```

<210> 18

<211> 210

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic DNA

<400> 18

```
ttacttcctt aggaattcac aggttcttag gagtggggag gttgagcact ttttcagatt 60
agtaatgcct gcgacatact gtggtcccaa atatTTTTca tatgttgttt tgccatggag 120
tctggcaaga cactcagtgt tgtcattgaa caaaagggtt ttggtttcag actggaataa 180
gcaaaacttg tccgggcagt cagatccatt                                     210
```

<210> 19

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic DNA

<400> 19

ggatccatgg gccgtaggag aaggagtgtt

30

<210> 20

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic DNA

<400> 20

gagctcttac ttccttagga attcacag

28

<210> 21

<211> 1367

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic DNA

<400> 21

taaaataatc	tatacattaa	aaaatttgat	tttaaaattt	tagaaattca	tgatttttatt	60
ttttttttacc	agaaatccgt	taatattggt	aaaatattac	caactaattt	ataaatttta	120
ttttaaggca	attaagcatg	tttgataaaa	tatatatatt	gttataaata	ctttttcaaaa	180
gtataaagtt	gatgatggcg	tgggtggtaga	ttatttttagt	tctaggttcg	aatgcaagtt	240
ggtttagaca	tttagcctta	ttcttttttc	taacccaaaat	aaatgtaaat	ggaaaacctt	300
taggaaaaaa	aagaaatcaa	aattgaaaac	atcatccggt	ggagtcgaga	agcccacacc	360
cacgtgaccc	aacaatatta	aaataagagt	ttgctctaca	gtaaatgcga	tactttttta	420
ttcaataactt	tttccacttc	taaaatcttg	gagatttgca	ccgttaacta	attaagtgtt	480
atatccaacg	gtcctaaaaa	aacttggtga	ccgtgcctca	catttcaact	ttgcgcaccc	540
tgaaagccgt	tatgtttagg	ttagtgtttg	caacagttga	agcgcacac	tcaggaggct	600
acttggtctt	gcttttgctg	cttttgttca	atttttcacg	tgattttgtt	ggtgaacacg	660
cgtacttgaa	acttattata	aattacataa	ttttataagt	ttcacttctt	atataatact	720
catataatat	atagggttta	gaatgccaat	ttttaaaaaa	agaataaaaa	aataaataga	780
ataaaatcga	aaaaatgaaa	tgtaaaaaat	ttgaggggga	caaataaaat	atgaaagtct	840
attattttaa	ttttccatta	gaattctatt	ttccttagtt	aatatgagct	agccagttgg	900
gagatacacg	aaaatgtcat	gaaacagttg	catgtaggga	aattaatgta	gtagagggat	960
agcaagacaa	aaatccaagc	caagctagct	gctcacgcga	actcgatcca	cacgtccttt	1020
acagagtttc	aaacggatga	aatctgcatg	gcatgcaact	aaagcattgt	tctcagctgc	1080
caagtacccc	tcacactcac	caaccctttg	tttttctccc	cattgcatgt	taactcaagt	1140
ttatcctttc	tttgcttctg	gaaatttcac	aagcctcaaa	cacgtcgacg	tccaatcttg	1200
tgaccaaacac	ggccaaaaga	aaagagaatc	tcatcccgtt	cacacttagc	cacttaaagc	1260
tagccaaacg	gtgatctttc	tctatatatt	gtagctctct	aacacaacca	acactaccat	1320
tattcaatat	tcaaaccttg	ctctatacta	cacacactag	aagaata		1367

<210> 22

<211> 962

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic DNA

<400> 22

```

gttttcaa at ttgaatttta atgtgtgttg taagtataaa tttaaaataa aaataaaaaac 60
aattattata tcaaaatggc aaaaacattt aatacgtatt atttattaaa aaaatatgta 120
ataatatatt tatattttta tatctattct tatgtatttt ttaaaaatct attatatatt 180
gatcaactaa aatattttta tatctacact tattttgcat ttttatcaat tttcttgctg 240
tttttggcat atttaataat gactattctt taataatcaa tcattattct tacatgggtac 300
atattgttgg aaccatatga agtggttcatt gcatttgact atgtggatag tgttttgatc 360
catgcccttc atttgccgct attaattaat ttggtaacag attcgttcta atcagttact 420
taatccttcc tcatcataat taatctggta gttcgaatgc cataatattg attagttttt 480
tggaccataa gaaaaagcca aggaacaaaa gaagacaaaa cacaatgaga gtatcctttg 540
catagcaatg tctaagttca taaaattcaa acaaaaacgc aatcacacac agtggacatc 600
acttatccac tagctgatca ggatcgccgc gtcaagaaaa aaaaactgga ccccaaaagc 660
catgcacac aacacgtact cacaaaggcg tcaatcgagc agcccaaaac attcaccaac 720
tcaacccatc atgagccac acatttggtg tttctaacc aacctcaaac tcgtattctc 780
ttccgcccacc tcatttttgt ttatttcaac acccgtaaaa ctgcatccca ccccggtggc 840
aaatgttcat gcatgttaac aagacctatg actataaata tctgcaatct cggcccaagt 900
tttcatcatc aagaaccagt tcaatatcct agtacgccgt attaaagaat ttaagatata 960
ct

```

<210> 23

<211> 692

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic human lactoferrin

<400> 23

```

Gly Arg Arg Arg Arg Ser Val Gln Trp Cys Ala Val Ser Gln Pro Glu
 1             5             10             15

Ala Thr Lys Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg Gly
                20             25             30

Pro Pro Val Ser Cys Ile Lys Arg Asp Ser Pro Ile Gln Cys Ile Gln
          35             40             45

Ala Ile Ala Glu Asn Arg Ala Asp Ala Val Thr Leu Asp Gly Gly Phe
 50             55             60

Ile Tyr Glu Ala Gly Leu Ala Pro Tyr Lys Leu Arg Pro Val Ala Ala
 65             70             75             80

Glu Val Tyr Gly Thr Glu Arg Gln Pro Arg Thr His Tyr Tyr Ala Val
          85             90             95

Ala Val Val Lys Lys Gly Gly Ser Phe Gln Leu Asn Glu Leu Gln Gly
          100            105            110

Leu Lys Ser Cys His Thr Gly Leu Arg Arg Thr Ala Gly Trp Asn Val
 115            120            125

```

Pro	Ile	Gly	Thr	Leu	Arg	Pro	Phe	Leu	Asn	Trp	Thr	Gly	Pro	Pro	Glu	
130						135					140					
Pro	Ile	Glu	Ala	Ala	Val	Ala	Arg	Phe	Phe	Ser	Ala	Ser	Cys	Val	Pro	
145					150					155					160	
Gly	Ala	Asp	Lys	Gly	Gln	Phe	Pro	Asn	Leu	Cys	Arg	Leu	Cys	Ala	Gly	
				165					170					175		
Thr	Gly	Glu	Asn	Lys	Cys	Ala	Phe	Ser	Ser	Gln	Glu	Pro	Tyr	Phe	Ser	
			180					185					190			
Tyr	Ser	Gly	Ala	Phe	Lys	Cys	Leu	Arg	Asp	Gly	Ala	Gly	Asp	Val	Ala	
		195					200					205				
Phe	Ile	Arg	Glu	Ser	Thr	Val	Phe	Glu	Asp	Leu	Ser	Asp	Glu	Ala	Glu	
	210					215					220					
Arg	Asp	Glu	Tyr	Glu	Leu	Leu	Cys	Pro	Asp	Asn	Thr	Arg	Lys	Pro	Val	
225					230					235					240	
Asp	Lys	Phe	Lys	Asp	Cys	His	Leu	Ala	Arg	Val	Pro	Ser	His	Ala	Val	
				245					250					255		
Val	Ala	Arg	Ser	Val	Asn	Gly	Lys	Glu	Asp	Ala	Ile	Trp	Asn	Leu	Leu	
			260					265					270			
Arg	Gln	Ala	Gln	Glu	Lys	Phe	Gly	Lys	Asp	Lys	Ser	Pro	Lys	Phe	Gln	
		275					280					285				
Leu	Phe	Gly	Ser	Pro	Ser	Gly	Gln	Lys	Asp	Leu	Leu	Phe	Lys	Asp	Ser	
	290					295					300					
Ala	Ile	Gly	Phe	Ser	Arg	Val	Pro	Pro	Arg	Ile	Asp	Ser	Gly	Leu	Tyr	
305					310					315					320	
Leu	Gly	Ser	Gly	Tyr	Phe	Thr	Ala	Ile	Gln	Asn	Leu	Arg	Lys	Ser	Glu	
				325					330					335		
Glu	Glu	Val	Ala	Ala	Arg	Arg	Ala	Arg	Val	Val	Trp	Cys	Ala	Val	Gly	
			340					345					350			
Glu	Gln	Glu	Leu	Arg	Lys	Cys	Asn	Gln	Trp	Ser	Gly	Leu	Ser	Glu	Gly	
		355					360					365				
Ser	Val	Thr	Cys	Ser	Ser	Ala	Ser	Thr	Thr	Glu	Asp	Cys	Ile	Ala	Leu	
		370				375					380					
Val	Leu	Lys	Gly	Glu	Ala	Asp	Ala	Met	Ser	Leu	Asp	Gly	Gly	Tyr	Val	
385					390					395					400	
Tyr	Thr	Ala	Gly	Lys	Cys	Gly	Leu	Val	Pro	Val	Leu	Ala	Glu	Asn	Tyr	
				405					410					415		
Lys	Ser	Gln	Gln	Ser	Ser	Asp	Pro	Asp	Pro	Asn	Cys	Val	Asp	Arg	Pro	
			420					425					430			

Val Glu Gly Tyr Leu Ala Val Ala Val Val Arg Arg Ser Asp Thr Ser
 435 440 445
 Leu Thr Trp Asn Ser Val Lys Gly Lys Lys Ser Cys His Thr Ala Val
 450 455 460
 Asp Arg Thr Ala Gly Trp Asn Ile Pro Met Gly Leu Leu Phe Asn Gln
 465 470 475 480
 Thr Gly Ser Cys Lys Phe Asp Glu Tyr Phe Ser Gln Ser Cys Ala Pro
 485 490 495
 Gly Ser Asp Pro Arg Ser Asn Leu Cys Ala Leu Cys Ile Gly Asp Glu
 500 505 510
 Gln Gly Glu Asn Lys Cys Val Pro Asn Ser Asn Glu Arg Tyr Tyr Gly
 515 520 525
 Tyr Thr Gly Ala Phe Arg Cys Leu Ala Glu Asn Ala Gly Asp Val Ala
 530 535 540
 Phe Val Lys Asp Val Thr Val Leu Gln Asn Thr Asp Gly Asn Asn Asn
 545 550 555 560
 Glu Ala Trp Ala Lys Asp Leu Lys Leu Ala Asp Phe Ala Leu Leu Cys
 565 570 575
 Leu Asp Gly Lys Arg Lys Pro Val Thr Glu Ala Arg Ser Cys His Leu
 580 585 590
 Ala Met Ala Pro Asn His Ala Val Val Ser Arg Met Asp Lys Val Glu
 595 600 605
 Arg Leu Lys Gln Val Leu Leu His Gln Gln Ala Lys Phe Gly Arg Asn
 610 615 620
 Gly Ser Asp Cys Pro Asp Lys Phe Cys Leu Phe Gln Ser Glu Thr Lys
 625 630 635 640
 Asn Leu Leu Phe Asn Asp Asn Thr Glu Cys Leu Ala Arg Leu His Gly
 645 650 655
 Lys Thr Thr Tyr Glu Lys Tyr Leu Gly Pro Gln Tyr Val Ala Gly Ile
 660 665 670
 Thr Asn Leu Lys Lys Cys Ser Thr Ser Pro Leu Leu Glu Ala Cys Glu
 675 680 685
 Phe Leu Arg Lys
 690

<210> 24

<211> 1157

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic DNA
gmbpsp

<400> 24

```
tctagagttt tcaaatttga attttaatgt gtgttgtaag tataaattta aaataaaaaat 60
aaaaacaatt attatatcaa aatggcaaaa catttaatac gtattattta ttaaaaaaat 120
atgtaataat atatttatat tttaatatct attcttatgt atttttttaa aatctattat 180
atattgatca actaaaatat ttttatatct acacttattt tgcattttta tcaattttct 240
tgcgtttttt ggcatattta atatgactat tctttaataa tcaatcatta ttcttacatg 300
gtacatattg ttggaaccat atgaagtgtt cattgcattt gactatgtgg atagtgtttt 360
gatccatgcc cttcatttgc cgctattaat taatttggtg acagattcgt tctaatacgt 420
tacttaatcc ttcctcatca taattaatct ggtagttcga atgccataat attgattagt 480
tttttggacc ataagaaaaa gccaaggaac aaaagaagac aaaacacatg agagtatcct 540
ttgcatagca atgtctaagt tcataaaatt caaacaacaa cgcaatcaca cacagtggac 600
atcacttatc cactagctga tcaggatcgc cgcgtcaaga aaaaaaaact ggaccccaaa 660
agccatgcac aacaacacgt actcacaag gcgtaaatcg agcgcccaaa acattcacca 720
actcaaccca tcatgagccc acacatttgt tgtttctaac ccaacctcaa actcgtattc 780
tcttcgcgca ctcatTTTTG tttatttcaa caccggtcaa actgcatccc acccgtggc 840
caaagtgtca tgcattgtta caagacctat gactataaat atctgcaatc tcggcccaag 900
ttttcatcat caagaaccag ttcaatatcc tagtacgccc tattaaagaa ttaagatat 960
actatgatga gagcgcggtt cccattactg ttgctgggag ttgttttcct agcatcagtt 1020
tctgtctcat ttggcattgc gtattgggaa aagcaaacc cagtcacaac aagtgcctcc 1080
gaagttgcaa tagcgagaaa gactcctaca ggaaccaagc atgccacgct cgttgcaacc 1140
tccttaaggt gggatcc 1157
```

<210> 25

<211> 1164

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic DNA
PCONGT7Sp6

<220>

<221> modified_base

<222> (534)

<223> a, t, c, g, other or unknown

<220>

<221> modified_base

<222> (763)

<223> a, t, c, g, other or unknown

<220>

<221> modified_base

<222> (787)

<223> a, t, c, g, other or unknown

<220>

<221> modified_base

<222> (789)

<223> a, t, c, g, other or unknown

<220>

<221> modified_base

<222> (878)

<223> a, t, c, g, other or unknown

<400> 25

tctagagttt	tcaaatttga	attttaatgt	gtggttgaag	tataaattta	aaataaaaaat	60
aaaaacaatt	attatatcaa	aatggcaaaa	acattttaata	cctattattt	aagaaaaaaa	120
tatgtaataa	tatatattata	ttttaaatatc	tattcttatg	tatttttttaa	aaatctatta	180
tatattgatc	aactaaaata	tttttatatc	tacacttatt	ttgcattttt	atcaattttc	240
ttgcgttttt	tggcatattt	aataatgact	attctttaat	aattaatcat	tattcttaca	300
tcgtacatat	tgttggaacc	atatgaagtg	tccattgcat	tcgactatgt	ggatagtgtt	360
ttgatccagg	cctccatttg	ccgcttatta	attaatttgg	taacagtccg	tactaatcag	420
ttacttatcc	ttcctccatc	ataattaatc	ttggtagtct	cgaatgccac	aacactgact	480
agtctcttgg	atcataagaa	aaagccaaga	acaaaaggag	acaaaacaca	atgnagagta	540
tcctttgcat	agcaatgtct	aagttcataa	aattcaaaca	aaaacgcaat	cacacacagt	600
gggacatcac	ttatccacta	gctgatcagg	atcgccgcgt	caagaaaaaa	aaaactggga	660
cccaaaagcc	atgcacaaca	acacgtactc	acaaagggtg	caatcgagca	gcccaaaaca	720
ttcaccaact	caacccatca	tgagcccaca	catttgttgt	ttntaaccce	acctcaaact	780
cgtattntnt	tcgcccacct	catttttgtt	tattccaaca	cccgtcaaac	tgcattgccac	840
cccgtggcca	aatgtccatg	catgttaaca	agacctanga	ctataaatat	ctgcaatctc	900
ggcccagggt	ttcatcatca	agaaccagtt	caatatccta	gtacaccgta	ttaaagaatt	960
taagatatac	tatgatgaga	gcgcggttcc	cattactgtt	gctggagttg	ttttcctggc	1020
atcagtttct	gtctcatttg	gcattgcgta	ttgggaaaag	cagaacccca	gtcacaacaa	1080
gtgcctccga	agttggaaat	gcgagaagac	tcctacagga	accaagcatg	ccacgctcgt	1140
tgcaacctcc	ttaaggtggg	atcc				1164